AMENDMENTS IN THE CLAIMS

Claims 1-57 are pending.

Claims 9, 12 and 13 are being amended. After the amendments, claims 1-57 will be pending.

Claim List

1. (Previously presented) A synthetic peptide of the formula I:

$(AXXDXXX)_n$ I

wherein

A is Ile, Leu, Val or a derivative thereof;

D is Leu, Ile, Val or a derivative thereof;

each X is an amino acid residue or derivative thereof which corresponds to an amino acid residue of an epitope of a native coiled-coil protein;

the X residues in each (AXXDXXX) repeat form a set of X residues; and n is equal to or greater than 1.

2. (Previously presented) The peptide of claim 1 wherein A is Ile and D is Leu in every (AXXDXXX) repeat.

3. (Previously presented) The peptide of claim 1 wherein n is about 3 to 6.

4. (Previously presented) The peptide of claim 1 wherein said X residues are amino acids that are solvent exposed in an coiled-coil region of the native protein.

5. (Previously presented) The peptide of claim 1 wherein each of said sets of X residues is from the same epitope of a single protein.

6. (Previously presented) The peptide of claim 1 which contains at least two different sets of X residues.

7. (Previously presented) The peptide of claim 6 wherein each of said different sets is independently selected from the group consisting of different epitopes of the same protein and epitopes from different proteins.

8. (Previously presented) The peptide of claim 1 which further comprises additional amino acids at the C-terminus and/or N-terminus of the peptide.

9. (Currently amended) The peptide of claim 8 wherein said additional amino acid residues are Cys-Nle-Gly ~~CNleG~~ at the N-terminus of the peptide.

10. (Previously presented) The peptide of claim 1 wherein the set of X residues correspond to a consensus sequence of solvent exposed residues of native coiled-coil proteins.

11. (Previously presented) The peptide of claim 10 wherein the coiled-coil proteins are selected from the group consisting of Pneumococcal surface protein A, Pneumococcal surface protein C, and Pneumococcal adhesin A.

12. (Currently amended) The peptide of claim 11 wherein the peptide comprises an amino acid sequence selected from the group consisting of ~~EELX$_1$X$_2$KIDELDX$_3$EIAX$_4$LEKX$_5$~~ Glu-Glu-Leu-X_1-X_2-Lys-Ile-Asp-Glu-Leu-Asp-X_3-Glu-Ile-Ala-X_4-Leu-Glu-Lys-X_5 (SEQ ID NO: 5) and ~~EELX$_1$X$_2$KIDELD~~ Glu-Glu-Leu-X_1-X_2-Lys-Ile-Asp-Glu-Leu-Asp (1-11 of SEQ ID NO: 5), wherein X_1, X_2, X_3, X_4 or X_5 is any amino acid.

13. (Currently amended) The peptide of claim 12 wherein

X_1 is ~~S, Q, N or D~~ Ser, Gln, Asn or Asp,

X_2 is ~~D, N or K~~ Asp, Asn or Lys;

X_3 is ~~A or N~~ Ala or Asn;

X_4 is ~~K, E or D~~ Lys, Glu or Asp; and

X_5 is ~~N, D or E~~ Asn, Asp or Glu.

14. (Previously presented) A synthetic peptide of the formula I:

$(AXXDXXX)_n$ I

wherein

A is Ile, Leu, Val or a derivative thereof;

D is Leu, Ile, Val or a derivative thereof;

each X is an amino acid residue or derivative thereof which corresponds to an amino acid residue of an epitope of a native coiled-coil protein, except at least one X is replaced with a charged amino acid residue in a manner which allows a salt bridge to form between the charged amino acid and another amino acid residue of an opposite charge, which salt bridge facilitates the peptide to assume a coiled-coil structure;

the X residues in each (AXXDXXX) repeat form a set of X residues; and n is equal to or greater than 1.

15. (Previously presented) A peptide of claim 14 wherein the charged amino acid is selected from the group consisting of Asp, Glu, Lys, Arg and His.

16. (Previously presented) A method of making a peptide of the formula I comprising:

a) selecting an epitope of a coiled-coil protein;

b) determining which amino acid residues of said epitope are solvent exposed; and

c) inserting said solvent exposed amino acid residues into the X positions of formula I.

17. (Previously presented) The method of claim 16 wherein the coiled-coil protein is a microbial protein.

18. (Previously presented) The method of claim 16 wherein the selection of epitopes is performed using a computer algorithm.

19. (Previously presented) The method of claim 16 wherein more than one set of epitopic amino acids is used.

20. (Previously presented) The method of claim 19 wherein each of said sets is independently selected from the group consisting of different epitopes of the same protein and epitopes from different proteins.

21. (Previously presented) A composition useful to stimulate an immune response in an animal, said composition comprising at least one peptide of formula I.

22. (Previously presented) The composition of claim 21 wherein the peptide of formula I is conjugated to a carrier protein.

23. (Previously presented) The composition of claim 21 further comprising an adjuvant.

24. (Previously presented) The composition of claim 21 which contains at least two different sets of X residues.

25. (Previously presented) The composition of claim 24 wherein each of said different sets is independently selected from the group consisting of different epitopes of the same protein and epitopes from different proteins.

26. (Previously presented) The composition of claim 24 which is useful to stimulate an immune response to more than one strain and/or species of microorganism.

27. (Previously presented) A method of eliciting an immune response in an animal, comprising administering a peptide of the formula I to said animal.

28. (Previously presented) An antibody which recognizes a peptide of the formula I.

29. (Previously presented) The antibody of claim 28 wherein the peptide of the formula I contains solvent exposed amino acids from a microbial protein.

30. (Previously presented) The antibody of claim 28 which binds to more than one strain and/or species of microorganism.

31. (Previously presented) The antibody of claim 28 which is polyclonal or monoclonal.

32. (Previously presented) A pharmaceutical composition comprising an antibody according to claim 28.

33. (Previously presented) The composition of claim 32 which further comprises a pharmaceutically acceptable excipient or carrier.

34. (Previously presented) An antibody produced by administering a peptide of the formula I to an animal so as to stimulate an immune response.

35. (Previously presented) A composition useful as a vaccine, wherein said composition comprises a peptide of formula I.

36. (Previously presented) The composition of claim 35 wherein more than one set of epitopic amino acids is used in the peptide of formula I.

37. (Previously presented) The composition of claim 36 wherein the sets of epitopic amino acids are from different strains and/or species of microorganism.

38. (Previously presented) The composition of claim 35 which provides cross protection to more than one strain and/or species of microorganism.

39. (Previously presented) The composition of claim 36 which provides cross protection to more than one strain and/or species of microorganism.

40. (Previously presented) The composition of claim 37 which provides cross protection to more than one strain and/or species of microorganism.

41. (Previously presented) The composition of claim 35 which further comprises a pharmaceutically acceptable excipient or carrier.

42. (Previously presented) A method of preventing a microbial infection comprising administering to a mammal susceptible to said infection a peptide of formula I.

43. (Previously presented) The method of claim 42 wherein more than one set of epitopic amino acids is used in the peptide of formula I and the sets of epitopic amino acids are from different strains and/or species of microorganism.

44. (Previously presented) The method of claim 42 which is useful to prevent infection by several strains and/or species of microorganism.

45. (Previously presented) The method of claim 43 which is useful to prevent infection by several strains and/or species of microorganism.

46. (Previously presented) A method of treating or preventing microbial infection in an animal susceptible to or suffering from such infection, comprising administering to said animal an effective amount of an antibody to a microbial protein, wherein said antibody is produced by administering a peptide of formula I to an animal.

47. (Previously presented) The method of claim 46 which prevents symptoms of infection in said animal.

48. (Previously presented) The method of claim 46 which is useful to treat or prevent infection by several strains and/or species of microorganism.

49. (Previously presented) A method of determining the presence of a particular microorganism in a sample comprising:

a) contacting the sample with an antibody to a peptide of formula I which peptide comprises epitopes from the particular microorganism; and

b) determining whether said antibody binds to a component of said sample.

50. (Previously presented) The method of claim 49 wherein the sample is a biological sample.

51. (Previously presented) The method of claim 49 which is used to determine the causative agent of a microbial infection.

52. (Previously presented) The method of claim 51 which is used to simultaneously detect the presence of several strains and/or species of microorganism in tile sample.

53. (Previously presented) The method of claim 50 which is used to simultaneously detect the presence of several strains,and/or species of microorganism in the sample.

54. (Previously presented) The method of claim 51 which is used to simultaneously detect the presence of several strains and/or species of microorganism in the sample.

55. (Previously presented) A method for determining the presence of antibodies to a microbial protein in a biological sample, comprising:

a) contacting said biological sample with a peptide of formula I, which peptide comprises at least one epitope from said microbial protein; and

b) determining whether antibodies in said biological sample bind to said peptide.

56. (Previously presented) The method of claim 55 which is used to determine prior exposure of an animal to a particular microorganism.

57. (Previously presented) The protein of claim 8 wherein the additional amino acids stabilize the peptide through the formation of lactam bridges.